



## EFSA Panel on Biological Hazards (BIOHAZ); Scientific Opinion on Composting and incineration of dead-on-farm pigs

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## SCIENTIFIC OPINION

### Scientific Opinion on Composting and incineration of dead-on-farm pigs<sup>1</sup>

EFSA Panel on Biological Hazards (BIOHAZ)<sup>2, 3</sup>

European Food Safety Authority (EFSA), Parma, Italy

#### ABSTRACT

A method for on-farm processing of Category (Cat) 2 Animal By-Products (ABP)<sup>4</sup> alternative to the ones already approved in the current legislation was assessed. The materials to be treated are placentas and dead-on-farm pigs. The proposed process consists of three sequential steps, i.e. composting, storage of mature compost and incineration of mature compost in authorized plants. The applicant identified the main biological, physical and chemical hazards that could be present in the material to be treated and in the compost substrate. Since the compost is only intended for incineration the applicant considered that the final step of the process would destroy all the relevant microbiological hazards and did not perform an experimental validation. The temperatures reached during composting are not able to inactivate the relevant hazards that could be present in the material to be processed and the compost has still to be regarded as a Cat. 2 ABP material. Therefore, pathogens may be disseminated during composting and storage which are the key steps for risk containment. The alternative method as proposed by the applicant was not performed in a closed system, which implies a risk of dissemination of biological hazards throughout the farm environment. Major deficiencies were noted in relation to the risk containment. Moreover, a formal HACCP plan was not provided, and some deficiencies were also noted in the identification of interdependent processes. Provided that the deficiencies identified are addressed and the composting and storage steps of the proposed process take place in a closed system under supervision, it was concluded that this alternative treatment would not pose an additional risk as compared to the processes currently approved in the legislation.

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#### KEY WORDS

Animal By-Products, alternative methods, on-site treatment, composting, incineration, dead-on-farm pigs

<sup>1</sup> On request from the French Competent Authority, Question No EFSA-Q-2011-00151, adopted on 26 January 2012.

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<sup>3</sup> Acknowledgement: The Panel wishes to thank the members of the Working Group on Assessment of Animal By-Products: Avelino Álvarez-Ordóñez, Reinhard Böhm, John Griffin and Christophe Nguyen-The for the preparatory work on this scientific opinion.

<sup>4</sup> Cat. 2 ABP is defined in Regulation (EC) No 1069/2009 of the European Parliament and of the Council of 21 October 2009 laying down health rules as regards animal by-products and derived products not intended for human consumption and repealing Regulation (EC) No 1774/2002 (Animal by-products Regulation) (OJ L 300, 14.11.2009).

## SUMMARY

Following a request from the French Competent Authority, the Panel on Biological Hazards was asked to deliver a scientific opinion on composting and incineration of dead-on-farm pigs.

The application received concerns an alternative method for processing Category (Cat) 2 Animal By-Products (ABP) as defined in Reg. (EC) 1069/2009<sup>5</sup>. The materials to be treated are placentas and dead-on-farm pigs.

The proposed process consists of three sequential steps, i.e. composting, storage of mature compost and incineration of mature compost in authorized plants.

The end-product is intended to be disposed of by incineration.

The identification and characterisation of the risk material was properly addressed in the application and a comprehensive list of possible hazards was provided.

Since the compost is only intended for incineration the applicant considered that the final step of the process would destroy all the relevant microbiological hazards and the applicant did not perform any experimental validation. The temperatures reached during composting are not able to inactivate the relevant hazards that could be present in the material to be processed and the compost has still to be regarded as a Cat. 2 ABP material. Therefore pathogens may be disseminated during composting and storage which are the key steps for risk containment. The alternative method as proposed by the applicant was not performed in a closed system, which implies a risk of dissemination of biological hazards able to survive the composting process throughout the farm environment.

Major deficiencies were noted by the Panel in relation to the risk containment. Moreover, a formal HACCP plan was not provided, and some deficiencies were also noted in the identification of interdependent processes.

Provided that the deficiencies identified are addressed and the composting and storage steps of the proposed process take place in a closed system under supervision of the competent authority, the Scientific Panel on Biological Hazards (BIOHAZ) concluded that this alternative treatment would not pose an additional risk as compared to the processes currently approved in the legislation.

The BIOHAZ Panel recommended that, in case of authorisation of this alternative method, it should be supervised on a regular basis by the competent authorities to verify the proper containment of the risks and to enable the identification of possible outbreaks of infectious diseases at an early stage.

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<sup>5</sup> Regulation (EC) No 1069/2009 of the European Parliament and of the Council of 21 October 2009 laying down health rules as regards animal by-products and derived products not intended for human consumption and repealing Regulation (EC) No 1774/2002 (Animal by-products Regulation) (OJ L 300, 14.11.2009).

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## **BACKGROUND AS PROVIDED BY THE FRENCH COMPETENT AUTHORITY**

The French authorities have the honour to send to the European Food Safety Authority, in order to assess it, a request for approval of a new method for disposal of category 2 animal by-products following Regulation (EC) 1774/2002 accompanied by a report.

INAPORC, the French pig professional association, performed experiments on an alternative treatment for fallen animals at the Institut Technique du Porc placed in ROMILLE.

These experiments were authorised by the French authorities for research purpose according to letter (a), point 1, Article 23 of Regulation (EC) 1774/2002 of 3 October 2002.

The goal of these experiments is to study the functioning of a system of composting of pig corpses followed by incineration in an establishment authorised according to the legislation related to environmental protection.

The French authorities verified that the request respects the essential formal aspects defined by the community's guidelines (SANCO/10060/2006).

Moreover, the French authorities verified that the request is in line with the EFSA recommendation given on its opinions of 7 September 2005<sup>6</sup>, 8 March 2007<sup>7</sup> and 21 October 2009<sup>8</sup>.

## **TERMS OF REFERENCE AS PROVIDED BY THE FRENCH COMPETENT AUTHORITY**

The French competent authority asked EFSA to assess the new method for disposal of category 2 animal by-products.

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<sup>6</sup> EFSA, Opinion of the Scientific Panel on Biological Hazards of the European Food Safety Authority on the safety vis-à-vis biological risks of biogas and compost treatment standards of animal by-products, 07 September 2005.

<sup>7</sup> EFSA, Opinion of the Scientific Panel on Biological Hazards on the safety vis-à-vis biological risk of the mesophilic process of biogas and compost treatment of Animal By-Products, 08 March 2007.

<sup>8</sup> EFSA, Statement on technical assistance related to the EFSA opinion on transformation of Animal By-Products into biogas and compost.

## ASSESSMENT

### 1. Introduction

After the submission of this application, Reg. (EC) 1774/2002<sup>9</sup>, laying down rules concerning Animal By-Products (ABP), was repealed by Reg. (EC) 1069/2009<sup>10</sup> (the ABP Regulation). Moreover, Reg. (EU) 142/2011<sup>11</sup> lays down rules to implement the ABP Regulation.

Considering that, the current assessment makes reference to the legislation currently in force as regard to ABP, i.e. Reg. (EC) 1069/2009 and Reg. (EU) 142/2011. In particular the assessment was performed taking into account the criteria laid down in Art. 20, point 5 of Reg. 1069/2009.

The terminology used in this assessment conforms to the “Guidelines for applications for new alternative methods of disposal or use of animal by-products” prepared jointly by the Health and Consumer Protection Directorate-General (DG-SANCO) and the European Food Safety Authority (EFSA) (EC, 2008). The assessment only considered biological hazards.

The application received concerns a new method for on-farm disposal of Category 2 material, particularly placentas and dead-on-farm pigs.

Generally long time storage and treatment of fallen animals on farm raises the question of delayed identification and reporting of infectious diseases to the veterinary authorities.

According to point (a), Art. 13 of the ABP regulation Category (Cat.) 2 material shall be disposed as a waste by incineration:

- i. directly without prior processing; or
- ii. following processing, by pressure sterilisation if the competent authority so requires, and permanent marking of the resulting material;

Dead-on-farm animals, which belong to Cat. 2 material, can also be composted according to point (e), Art. 13 of the ABP regulation following processing by pressure sterilisation and permanent marking of the resulting material.

Nevertheless, alternative methods of use or disposal of animal by-products may be authorized following the procedure established in Art. 20 of Reg. 1069/2009.

#### 1.1. The method as described by the applicant

The proposed alternative method is intended to be used for the disposal of placentas and dead-on-farm pigs and consists of three sequential steps:

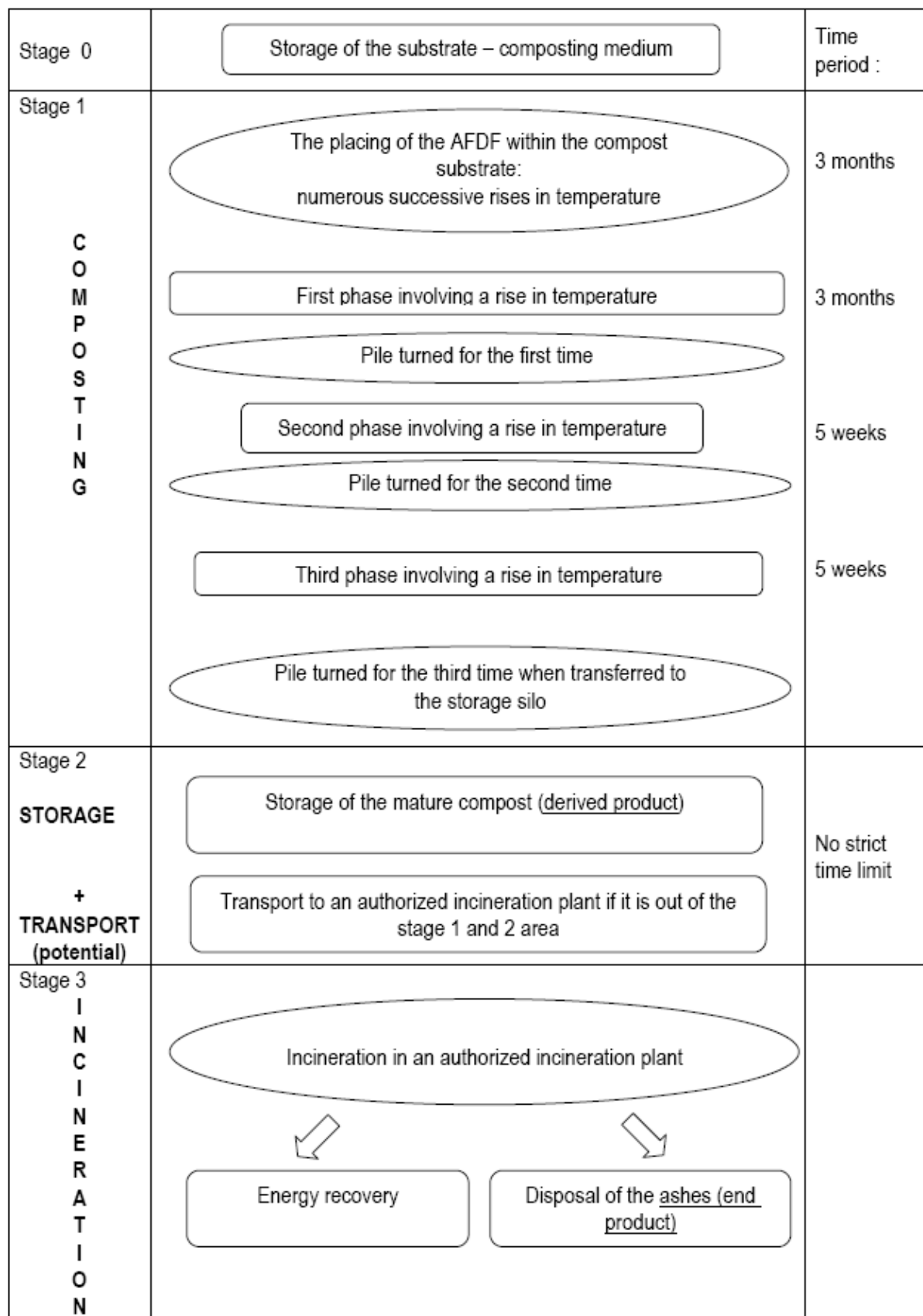
1. **composting**, as a process of mesophilic and aerobic degradation and stabilisation;
2. **storage** of mature compost, which is not the end-product of the process;
3. **incineration** of mature compost in authorized plants.

<sup>9</sup> Regulation (EC) No 1774/2002 of the European Parliament and of the Council of 3 October 2002 laying down health rules concerning animal by-products not intended for human consumption (OJ L 273, 10.10.2002).

<sup>10</sup> Regulation (EC) No 1069/2009 of the European Parliament and of the Council of 21 October 2009 laying down health rules as regards animal by-products and derived products not intended for human consumption and repealing Regulation (EC) No 1774/2002 (Animal by-products Regulation) (OJ L 300, 14.11.2009).

<sup>11</sup> Commission Regulation (EU) No 142/2011 of 25 February 2011 implementing Regulation (EC) No 1069/2009 of the European Parliament and of the Council laying down health rules as regards animal by-products and derived products not intended for human consumption and implementing Council Directive 97/78/EC as regards certain samples and items exempt from veterinary checks at the border under that Directive (OJ L 54, 26.2.2011).

A flow diagram of the proposed method is shown in Figure 1.



**Figure 1:** Extract from the applicant’s report: Flow diagram of the proposed process



The proposed method is based on an experimental work carried out in France. The project was coordinated by the French Pork and Pig Institute (IFIP) on behalf of the French pig professional association in the National Experimental Pig Station (SCEA) placed in Romillé. Five trials were performed under real farming conditions during the period from May 2008 to June 2010.

According to the applicant the incineration step could be carried out either on-farm and outside the farm (when the incineration plant is located outside the farm where the composting and storage sites are placed).

### 1.1.1. Composting

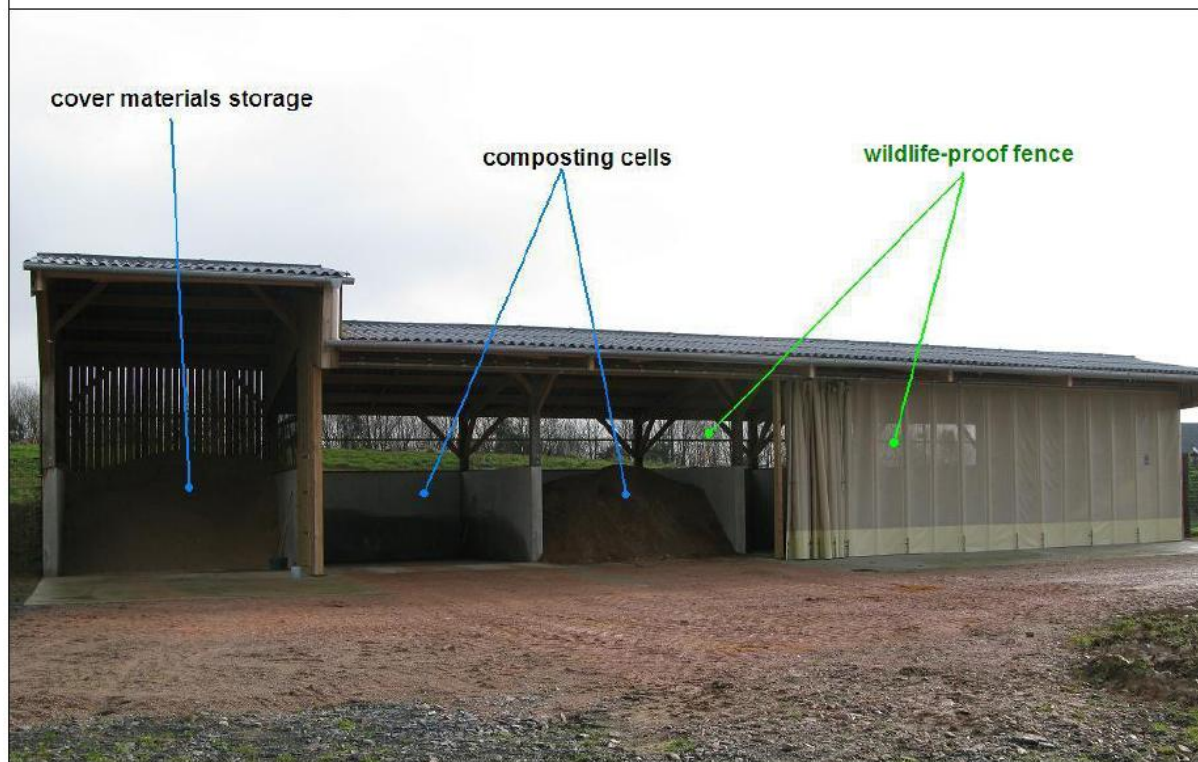
The applicant reports that the facilities where the composting process is carried out have to be placed under a waterproof roof and protected by a wildlife proof fence.

The composting process is carried out in cells with a waterproof floor and delimited by brick walls on three sides (Fig. 2). The cells shall be connected with a drainpipe in order to collect any eventual effluent.

Four cells are foreseen: two primary cells (meaning the cells where the first phase of carcass degradation takes place) and two secondary cells (where the material is moved after the first and second turning of the pile).

The facilities shall be designed in a way that the size of the primary cells is sufficient to contain all the farm mortalities occurring during a three-month period. The applicant suggests that the facilities should be slightly larger than the normal need in order to be able to manage a rise in the normal mortality rate.

Overview of the composting and storage facilities at the pig experiment station:



**Figure 2:** Picture of the facilities where the experiment has been performed as provided in the applicant's report



The fallen pigs are piled up in the primary cell 1 for three months. The carcasses are piled up following a precise plan. First a 30 centimetre layer of sawdust is placed on the ground. The carcasses are then placed on this first layer of sawdust and covered with a layer of sawdust at least 20 cm thick. When the cell is filled, approximately after 5 or 6 layers of fallen pigs, a first period of 3 months involving a rise in temperature allows the degradation of all the soft tissue. During this three-month phase, the fallen pigs occurring on-farm are placed in primary cell 2.

At the end of this first phase the compost pile is moved to secondary cell 1, for a second 5-week phase during which temperature rises.

At the end of the period, the compost pile is turned again and transferred to secondary cell 2 for another 5 weeks period in order to make it easier for a third phase during which temperature rise occurs (this transfer frees secondary cell 1 for the contents of primary cell 2).

At the end of this third phase lasting five weeks, the mature compost is transferred to the storage cell awaiting incineration.

### **1.1.2. Storage**

According to the applicant mature compost is a stabilized derived product which does not emit odours and that can be stored awaiting for incineration. No time limit is foreseen for the storage phase.

### **1.1.3. Incineration**

In case the incineration plant is placed outside the farm the mature compost has to be transported according to the applicable legislation.

The incineration of the compost has to be carried out according to the applicable legislation in an authorised plant.

## **2. Risk categories**

The application concerns animal by-products of Cat. 2 material as defined in the Regulation (EC) 1069/2009.

## **3. Identification and characterisation of risk material**

The material to be treated consists of placentas and dead-on-farm pigs.

The applicant considered the hazards that could be present in the material to be treated and in the compost substrate (i.e. sawdust, shavings, wood or chips, ground cereal straw, ground cornstalks or a mixture of the above-mentioned material) during the development of the compost process in normal conditions. The assessment of the possible microbiological hazards potentially present in the material to be treated and in the compost substrate was performed utilising bibliography, existing legislation and experts' opinion. Physical and chemical hazards were also considered. A list of microbiological, chemical and physical hazards was provided.

To take into account the hazards that could occur during abnormal conditions, the applicant considered the first two steps of the proposed alternative method: composting and storage. The hazards that could potentially occur under different conditions (e.g. anaerobic conditions in the composting material, low C/N ratio, fire) were identified. As regards to the incineration step, the applicant reported that no hazard that could occur during this stage was identified.

The applicant assessed the human and animal exposure to the identified hazards under normal and abnormal operating conditions.

Since the compost is not intended to be used but incinerated the applicant considered that the final step of the process would destroy all the microbiological hazards.

As for the physical hazards (e.g. foreign bodies) the application reports that the material is not intended to be handled manually so they do not represent a risk. The applicant also considered the irritant nature of the wood dust used as a compost substrate. It concluded that considering the short term and low level of exposure to it and the fact that it is not characterized by acute toxicity wood dust does not represent a risk.

Considering the chemical hazards, the applicant assessed the possible presence of different groups that could be formed during the degradation of the material in the composting step (e.g. reduced sulphur compounds, nitrogen compounds, aldehydes, ketones, carboxylic acids, alcohols, phenolic compounds, carbon dioxide and methane). It was concluded that the possible presence of ammonia and reduced volatile sulphur compounds could represent a potential risk.

In order to assess the potential risk deriving from ammonia and reduced volatile sulphur compounds, the applicant measured the presence of these substances during the composting step of the process. Five series of measurements in 4 different locations (not reported) of the composting pile in the period from 16/09/2008 and 31/03/2009 were performed. With regard to ammonia, one reading went over the short term occupational exposure limit of 20ppm and was measured at 25ppm. However, the measure was taken just a few centimetres above the surface of the compost pile and it is likely that the compound is diluted as soon as it moves away from the surface of the compost pile. The presence of reduced volatile sulphur compounds was not detected.

The applicant concluded that ammonia and reduced volatile sulphur compounds do “*not constitute an unacceptable risk*”.

#### **4. Agent risk reduction**

The applicant did not perform an experimental validation; however it was considered that, since the compost material has to be submitted to the final incineration in an authorised plant, all the risk would be eliminated by this last step.

#### **5. Risk Containment**

The applicant identified a number of key risk containment measures during the composting and storage steps:

- covered facilities;
- waterproof platforms;
- wire netting to protect against animals (e.g. rodents, foxes, dogs, cats, birds...);
- pest control plan.

The target parameters for the incineration step are provided by the current legislation.

However, the Panel observed major deficiencies in the application in relation to risk containment during composting and storage. For example, cleaning and disinfection of the facilities and hygienic management of equipments are not addressed. In addition, plans to control pests (birds, rodents, insects and other vermin), as set out in Reg. 142/2011, are not presented.

Moreover, no formal HACCP scheme was presented.

The temperatures reached during the composting process are not able to inactivate the relevant biological hazards that could be present in the material to be processed. Thus, composting is not enough to minimize the microbiological risks and the mature compost must still be considered as Cat. 2 material and thus should be stored according to the requirements prescribed in legislation for this category of ABP. Therefore, both composting and storage of the mature compost are the key steps for risk containment, since there is a risk of dissemination of biological hazards throughout the farm environment (i.e. the facilities are not really a closed system, there are no solid walls and doors and no solid floor exists around the building).

In order to contain the existing risk, composting and storage of mature compost must be performed in a closed system.

Since the movements of fallen animals from other farms to the composting site would increase the risks of dissemination of infectious diseases this should be avoided.

## **6. Identification of interdependent processes**

The applicant did not identify any interdependent process that may influence the risk reduction capacity of the proposed alternative method.

According to the proposed process, the material to be treated is not collected and stored on farm before processing but should be moved without delay to the primary cell for the composting step.

The treatment of the potential waste water generated by the composting phase is not described by the applicant.

When the incineration plant is located outside the farm, the mature compost has to be transported. In any case the mature compost has to go directly to the incineration plant. At this stage this material has still to be considered as Cat. 2 material. Provided the transport of the mature compost is performed according to the applicable legislation for Cat. 2 material, there is no difference with the current practice of transporting fallen pigs to the place of incineration or processing.

## **7. Intended end-use of the products**

The material is intended to be disposed of by incineration.

## **8. Documentary evidence**

The applicant provided an application dossier detailing the steps of the analysis performed and describing the experiment that was carried out. A documentary report of the French competent authority was also provided.

## CONCLUSIONS AND RECOMMENDATIONS

### CONCLUSIONS

- The application concerns an alternative treatment for disposal of Animal By-Products of category 2, as defined in the Regulation (CE) 1069/2009. The treatment consists of three steps: composting, storage and incineration. According to the current legislation, category 2 material can be disposed of as a waste by incineration directly without prior processing or following processing by pressure sterilisation and permanent marking if the competent authority so requires.
- Major deficiencies were noted by the Panel in relation to the risk containment. Moreover, a formal HACCP plan was not provided.
- The composting step of the alternative method does not inactivate all the potential biological hazards that could be present in the material to be processed. Therefore, the resulting compost has still to be regarded as a category 2 animal by-product material.
- The composting and storage steps of the alternative method as proposed by the applicant were not performed in a closed system. This implies a risk of dissemination of biological hazards able to survive the composting process throughout the farm environment.
- Some deficiencies in the identification of interdependent processes were also noted.
- Provided that the above mentioned points are considered and the composting and storage steps of the proposed process take place in a closed system under supervision of the competent authority, this alternative treatment would not pose an additional risk as compared to the processes currently approved in the legislation.

### RECOMMENDATIONS

- In case of authorisation of this alternative method, it should be supervised on a regular basis by the competent authorities to verify the proper containment of the risks and to enable the identification of possible outbreaks of infectious diseases at an early stage.

### DOCUMENTATION PROVIDED TO EFSA

1. Letter n° 443-T11OP036/RH AGRAP-RP 131/11 dated 21 February 2011 transmitting an application for approval of a new alternative method for disposal of category 2 Animal By-Products. Submitted by the French permanent representation to the European Union.
2. Letter n° 1167-T11OP093/RH AGRAP-RP 347/11 dated 6 May 2011 transmitting an updated version of the documentary report of the French Competent Authority. Submitted by the French permanent representation to the European Union.
3. Letter n° 1920-T11OP157/RH AGRAP-RP 572/11 dated 26 July 2011 transmitting an updated version of the application dossier. Submitted by the French permanent representation to the European Union.
4. Letter n° 221-T11OP184/RH AGRAP-RP 673/11 dated 7 September 2011 providing corrections to the English translation arranged by EFSA of the documentary report of the French Competent Authority. Submitted by the French permanent representation to the European Union.

### REFERENCES

EC (European Commission), 2008. Guidelines for applications for new alternative methods of disposal or use of animal by-products.